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cavity in this dinosaur is quite extensive and corresponds in position to the human sphenoidal sinus and resembles this structure in some of its complications such as are occasionally found in man. The structure seems to occupy portions of both the basisphenoid and the basioccipital and to extend a considerable distance toward the occipital condyle. There are five, possibly six, saccular divisions of the sphenoidal sinus (*recessus basisphenoidalis*). These divisions recall the saccular divisions of the sphenoidal and frontal sinuses of man and from their smooth walls one would expect to find a membranous lining as in man. So far as I am aware this cavity has no connection with the nasal cavity, although such a connection may be demonstrated from additional or from a restudy of present material. The recess lies below and between the points of exit of the third and twelfth cranial nerves, the mass of the brain being immediately above it. Several authors have observed a similar depression in the sphenoidal region of the Labyrinthodont skull and in other primitive vertebrates, notably the early reptiles. It is a well known fact that the hypophysis and particularly the posterior portion of this structure is, in the early land vertebrates, quite large and it has been the natural assumption that the large recess near where the hypophysis occurs should lodge the glandular organ, but it is entirely probable that the recess is the sphenoidal sinus. There is no necessity of adopting Osborn's term *recessus basisphenoidalis* since there is no doubt that the structure corresponds well with the *sinus sphenoidalis* of man. It is to be hoped that someone will take up the question of the general homologies of these cavities in different groups of vertebrates so that we may have a firm basis on which to work. The value of fossil animals in furnishing facts of anatomical importance has never been fully realized and it is to be hoped that an attempt will be made to fill this gap.

ROY L. MOODIE

DEPARTMENT OF ANATOMY,  
THE UNIVERSITY OF ILLINOIS,  
CHICAGO, ILLINOIS

#### SCIENTIFIC BOOKS

*Human Physiology.* By PROFESSOR LUIGI LUCIANI. In four volumes; Volume II. Translated from the Italian by FRANCES A. WELBY. London, 1913.

The realm of physiology has become so extensive that the preparation of an encyclopedic treatise on the subject by a single author is a notable intellectual feat. The admirable manner in which Luciani has accomplished this feat in his *Fisiologia dell' Uomo*, is testified to by translations which have been made into both Spanish and German. Not only does the book include a review of recent and generally accepted observations and interpretations, but also in many subjects an account of the historical development of our knowledge from ancient to modern times. The reader is thus given a perspective which is rarely obtained except by particular historical research.

A very considerable part of the value of Luciani's great handbook arises from his generous citation of original sources, both old and recent. This feature gives the exposition a permanent utility for the careful student who desires to become acquainted with reports by the discoverers themselves. Such a student should not depend wholly on English and German references to literature; he would do well to examine also French and Italian summaries, for, it must be admitted, there are not infrequently possibilities of tracing work thus which has not been represented where we have been most accustomed to look. Luciani's bibliographies present a rich mine of references to Italian as well as to other original papers.

The present volume (number II. of the four volumes of an English translation) is a good example of the whole. It is concerned with the internal secretions, the digestive secretions, the processes of digestion both mechanical and chemical, absorption and excretion. Many of the illustrations are taken from the original investigations, and a number of them are colored. The chief criticism that can be made against the work is that during the time required for its writing and being translated physiology has been going

forward so rapidly that important researches of the past four or five years are not found included in it. This defect, however, as intimated above, may be regarded as compensated for by the comprehensive and historical sweep which characterizes Luciani's survey of the subject.

W. B. CANNON

*The Wonder of Life.* By J. ARTHUR THOMSON. New York, Henry Holt and Company, 1914.

Once more we are indebted to Professor Thomson for a semipopular work on biology, this time with contents of a very miscellaneous character, better to reflect the varied aspects of living nature. We have, in fact, a biological (mainly zoological) scrap-book, full of interesting matters gleaned from more or less recent literature, carefully selected and digested for our benefit. All this is loosely thrown together under several general headings, "The Drama of Life," "The Haunts of Life," "The Insurgence of Life," "The Ways of Life," "The Web of Life," "The Cycle of Life" and "The Wonder of Life," with more than 300 separate minor topics. Each chapter is headed by a selection from the aphorisms of Goethe, as translated by Huxley. The book is admirably adapted for "supplementary reading" in a course on biology or zoology, or it might itself be made the basis of a seminar course. Its great value lies in its wide scope and breadth of view, with every emphasis on vital phenomena rather than on morphological details or classification. It is addressed, however, to an educated public, and even in places presupposes more zoological knowledge than most of us can boast. For example, on page 105 we are pulled up short by the startling announcement that "no one expects to find a Crustacean like *Byotrephes longimanus* in a pond." It is probably true that very few have ever approached a pond with any such expectation! Doubtless it is good for us, however, to bump now and again into things we do not understand, merely to diminish that conceit which too readily develops after reading discussions so lucid as those of Professor Thomson.

The specialist will here and there find things not quite up to date, or stated without sufficient reference to diverse points of view, but the general impression gained is that the work is admirably done, and that in all probability no other naturalist could have done it better, if so well. The illustrations, including many colored plates, are pleasing and instructive, but not up to the standard of the text. Some are really bad, as Fig. 81, a colored plate of leaf-insects (*Phyllium*). The coloring of the foliage, to correspond with the insects, is unnatural and without any adequate basis; while the insects are drawn from mounted specimens with the legs spread in the conventional way, without any reference to the plant on which they are supposed to be resting! The most ridiculous object is the young one, shown as resting on a nearly upright branch, with its legs waving wildly in the air. The whole thing is certainly, as it stands, a piece of "nature-faking." Fig. 39, representing young spiders, shows some of them with the head and thorax separate, like an insect.

There is a passage on page 595, beginning the discussion of the Transmissibility of Acquired Characters, which indicates that such transmission is perfectly easy in unicellular animals, which simply divide into two. Jennings has well shown the fallacy of this naïve conception, and it seems surprising that Professor Thomson should offer it, not merely as an idea, but as a well-known fact.

T. D. A. COCKERELL

UNIVERSITY OF COLORADO

### SPECIAL ARTICLES

#### MICRODISSECTION STUDIES ON THE GERM CELL<sup>1</sup>

THIS paper records a continuation of the observations published recently<sup>2</sup> in SCIENCE on the male germ cells of the grasshopper, *Disosteira Carolina*, and of the cockroach, *Periplaneta Americana*. The cells were iso-

<sup>1</sup> Slightly modified from a paper read before the American Society of Zoologists, Philadelphia, December 29, 1914.

<sup>2</sup> Robert Chambers, Jr., "Some Physical Properties of the Cell Nucleus," SCIENCE, N. S., XL, p. 824, 1914.